Pollution Prevention Progress Report

U.S. Department of Energy ■ October 1998

Albuquerque Operations Office

Kansas City Plant (KCP)

AlliedSignal's printed circuit board production facility eliminated ferric chloride etchant from the hot air, solder dip, leveling operation, reducing the amount of KCP's Industrial Wastewater Pretreatment Facility sludge. This source reduction activity reduced routine operations hazardous waste by less than one metric ton annually. Cost savings are not available at this time.

The same facility also used an ammonical copper chloride etching solution in one operation, and a ferric chloride etchant in a different operation. After conducting extensive tests, a determination was made to use the ferric chloride solution for both operations, which decreased sludge from the site's Industrial Wastewater Pretreatment Facility by 3.2 metric tons per year. This source reduction activity reduced routine operations hazardous waste by approximately one metric ton. Cost savings are not available at this time.

Los Alamos National Laboratory (LANL)

To reduce cleanup/stabilization waste, LANL segregates and recycles lead and steel site-wide. In June, lead and steel material that had been stored for final disposition was recycled from the TA-53 accelerator facility. Since materials used at TA-53 could possibly be activated, the material was suspect low-level mixed waste due to it's origin and lead content. The material was surveyed and determined to be not activated, and as a result, it was recycled. This segregation activity reduced routine operations low-level mixed waste by approximately 338 cubic meters, for a reported cost savings of approximately $25.5 million.

Chicago Operations Office

Argonne National Laboratory–East (ANL-E)

The Environmental Management Operations' Waste Management Department at ANL–E decontaminated 19,400 pounds of low-level radioactively-contaminated steel-encased lead. The lead was then released to the ANL-E lead storage bank for reuse. This segregation activity reduced routine operations low-level mixed waste by approximately nine cubic meters, for a reported cost savings of $38,800.

Argonne National Laboratory–West

Mercury removed from the Experimental Breeder Reactor-II Inter Building Coffin was sent to Bethlehem Apparatus for reuse rather than declaring the mercury a hazardous waste and disposing of it. This recycle/reuse activity reduced routine operations hazardous waste by less than one metric ton, for a reported cost savings of $2,700.

A new shielded sample container was to be fabricated for the Environmental Management Laboratory, but a surplus shielded container was found that met the requirements. This eliminated purchasing a new container, and disposing of the old container. This recycle/reuse activity reduced routine operations low-level mixed waste by less than one cubic meter, for a reported cost savings of $15,000.

Fermi National Accelerator Laboratory (Fermi)

Fermi physically separated radioactive accelerator beam pipe chamber material from non-radioactive material, generating a profit from recycling, and savings from avoided waste disposal costs. This segregation activity reduced routine operations low-level radioactive waste by approximately 12 cubic meters, for a reported cost savings of $16,100.

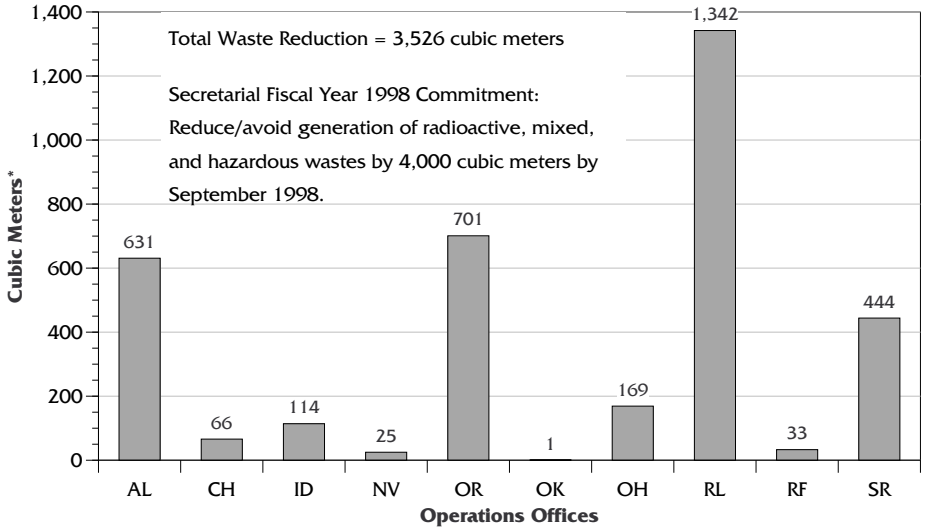
PP Quarterly Facts

April 98 – June 98

- *122 radioactive, mixed, and hazardous waste pollution prevention projects completed.*
- *3,526 cubic meters of radioactive, mixed, and hazardous waste reduced.*
- *$21.3 million estimated waste avoidance savings.*

Note: Waste avoidance savings are calculated using the INEEL formula.

Radioactive, Mixed, and Hazardous Waste Reductions for All Operations Offices (Routine Operations and Cleanup/Stabilization), April 1998 – June 1998



*Assuming one cubic meter is equivalent to one metric ton.

Idaho Operations Office

Idaho National Engineering and Environmental Laboratory

Engine oil is collected by a recycling vendor for energy recovery at the Ashgrove cement plant in Inkom, Idaho. This recycle/reuse activity reduced routine operations hazardous waste by approximately 31 metric tons, for a reported cost savings of $628,800.

The Mobile Test Assembly Cask was dismantled, with clean lead sent to the clean lead storage area for recycling. This recycle/reuse activity reduced cleanup/ stabilization hazardous waste by approximately 20 metric tons, for a reported cost savings of $408,600.

Nevada Operations Office

Nevada Test Site

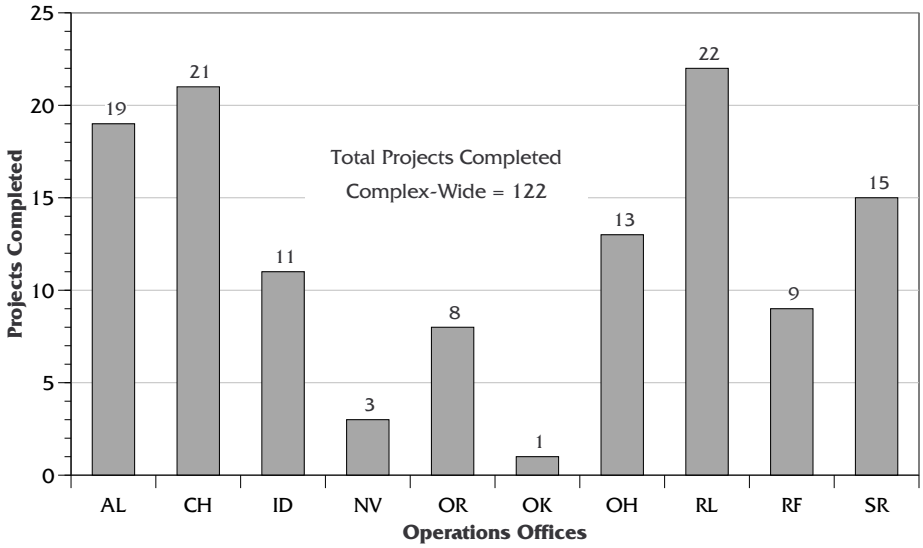
Recycled diesel fuel from Area 1 Drilling was reused by the Area 23 Gas Station. This recycle/reuse activity reduced cleanup/ stabilization hazardous waste by approximately 15 metric tons, for a reported cost savings of $180,520.

Oak Ridge Operations Office

East Tennessee Technology Park

The High Pressure Asher Laboratory in K-1004-B is used to perform metals analyses on waste oils destined for the Toxic Substances Control Act (TSCA) incinerator. The laboratory developed a new way to digest the oil samples without contaminating them with certain acids. This eliminated generation of approximately five gallons/ week of polychlorinated biphenyl-contaminated acids, and reduced generation of Resource Conservation and Recovery Act (RCRA) contaminated acids from approximately 500 milliliters/day to only five milliliters/day. The laboratory now uses a mixture of 50 percent nitric acid and 50 percent hydrochloric acid heated to 300 degrees Fahrenheit, reuses the acid mixture until it can no longer solubilize the metals, and neutralizes the acid mixture with micro-soap. This source reduction activity reduced routine operations low-level mixed waste by only a marginal amount, while mixed TSCA waste was reduced by approximately one cubic meter, for a total reported cost savings of $23,950.

Completed Projects for Radioactive, Mixed, and Hazardous Wastes for All Operations Offices (Routine Operations and Cleanup/Stabilization), April 1998 – June 1998



Oak Ridge National Laboratory (ORNL)

Oil-lubricated vacuum systems were originally used for an ongoing experimental process involving highly corrosive/reactive gases that accelerated the breakdown of normal lubricating fluids. This system required fluids to be changed at least twice a month. Even with accelerated maintenance, conventional pumps were rebuilt frequently and replaced annually. Previous experience showed special dry vacuum pump systems could replace these systems and eliminate the need for oil and oil-contaminated waste. This project eliminated four oil-using vacuum pumps, which were replaced with one dry pump, avoiding 100 percent of the waste and associated hazards. This source reduction activity reduced routine operations hazardous waste by approximately one metric ton, for a reported cost savings of $51,290.

Oak Ridge Y-12 Plant

As a major part of a cleanup/cleanout campaign underway for ORNL facilities located at Y-12, various scrap metals (including clean and contaminated carbon steel and copper) are sold to an outside vendor for cleaning and recycling. This eliminated the need to transfer the scrap to facilities near the main ORNL facilities complex, as well as the associated transportation costs. Costs recovered from the sale are used to continue the cleanup/cleanout effort. This recycle/reuse activity reduced routine operations low-level mixed waste by approximately 693 cubic meters, for a reported cost savings of $292,722.

Acrylic resin-bonded graded density cartridge filters were evaluated at the Liquid Storage Facility as a substitute for cotton string-wound cartridge filters. Testing of the 10-micron filters showed that the acrylic filters lasted about twice as long as the cotton filters. For the 1-micron filters, the difference was even greater: the acrylic filters lasted four to five times longer than the cotton filters. Substituting acrylic filters for cotton filters reduced annual filter usage from about 2,000 to 800 filters, resulting in significant cost savings and a reduction in the generation of two wastestreams. This source reduction activity reduced routine operations low-level mixed waste by approximately one cubic meter, and reduced mixed TSCA waste by approximately one metric ton, for a total reported cost savings of $12,000.

Oakland Operations Office

Energy Technology Engineering Center

Approximately 3,000 pounds of residual sodium were converted to sodium hydroxide and recycled. This recycle/reuse activity reduced routine operations hazardous waste by approximately one metric ton, for a reported cost savings of $200,000.

A total of 138 clean concrete blocks (each weighing up to 20,000 pounds) from the decommissioning of Building 20 were shipped to a state-licensed site adjacent to the Santa Clara River for use as fill for the construction of flood control levees. This recycle/reuse activity reduced cleanup/stabilization sanitary waste by approximately

Pollution Prevention Recognition

Argonne National Laboratory –East's *technique for manufacturing low-cost, environmentally friendly solvents won an award in the "Environment" category of the 1998 Discover Magazine Awards. The process, "Novel Membrane-Based Process for Producing Lactate Esters—Nontoxic Replacements for Halogenated and Toxic Solvents," is based upon selective membranes that permit low-cost synthesis of high-purity ethyl lactate and other lactate esters from carbohydrate feedstock. This "green solvent" technology also won a 1998 Presidential Green Chemistry Challenge Award. This national honor recognizes the new technology's potential to replace millions of pounds of toxic industrial solvents with an "environmentally friendly" substitute. The process was developed by Rathin Datta, Shis-Perng Tsai, Mike Henry, and Jim Frank of the Energy Systems Division.*

Generator Set-Aside Fees collected from the ***Oak Ridge Y-12 Plant's*** *waste generator tax provided $50,000 to the Special Materials Organization for implementing a project that replaces corroded steel Kathabar regenerators with fiberglass units. This source reduction project will be tracked in the Y-12 Pollution Prevention data base.*

Pollution Prevention Recognition

*At the **East Tennessee Technology Park** (ETTP), the ORNL Surveillance and Maintenance Program and the National Metals Recycling Program continue interfacing to facilitate the transfer of heavy equipment located at ORNL to ETTP's K-770 Scrap Yard for reuse/resale as part of the planned Fiscal Year 1998 sales agreement sponsored by the National Recycled Metals Program. Successful transfer of this equipment will avoid disposal of the equipment as low-level radioactive waste.*

*A Pollution Prevention (P2) Awareness Celebration was conducted during the last two weeks of June at the **East Tennessee Technology Park**. Special exhibits were set up at the cafeteria during lunch hours, and P2-related banners and slogans were displayed throughout the site. Fourteen awards were distributed to 40 individuals for their outstanding Calendar Year 1997 source reduction, recycling, and awareness efforts. Collectively, those projects receiving awards avoided the generation of over 3,800 cubic meters of waste, and saved over $1.2 million.*

*In May 1998, the **Portsmouth Gaseous Diffusion Plant** presented an exhibit and awareness materials at the annual Celebrate Earth Festival in Columbus, Ohio.*

635 metric tons, for a reported cost savings of $220,000.

Ohio Field Office

Battelle Columbus Laboratories

Disposal of 285 cubic feet of soil and water classified as RCRA-regulated low-level mixed waste was avoided through the radiological free-release program at a commercial RCRA disposal facility. This segregation activity reduced cleanup/stabilization low-level mixed waste by approximately eight cubic meters, for a reported cost savings of $480,125.

Fernald Environmental Management Project (FEMP)

Trash originally destined for disposal as low-level radioactive waste is now diverted to a sanitary landfill through the "Green Is Clean" Program. This segregation activity reduced routine operations low-level radioactive waste by approximately 51 cubic meters, for a reported cost savings of $14,266.

FEMP implemented a program to replace cardboard boxes with plastic reusable containers to store and transport reconditioned respirators. This source reduction activity reduced routine operations low-level radioactive waste by approximately 18 cubic meters, for a reported cost savings of $33,772.

Mound Plant

Ferrous and non-ferrous metals were collected from various construction sites and shutdown projects (including excess office equipment that was too damaged for resale). This recycle/reuse activity reduced cleanup/stabilization sanitary waste by approximately 60 cubic meters, for a reported cost savings of approximately $1,347.

West Valley Demonstration Project

Excess mercury thermometer stock was donated to a local university's chemistry department for reuse instead of disposal. This recycle/reuse activity reduced routine operations hazardous waste by approximately one metric ton, for a reported cost savings of $900.

Non-radioactive vitrification test glass was sent offsite to an asphalt vendor for reuse as aggregate. This recycle/reuse activity reduced routine operations sanitary waste by approximately 105 metric tons, for a reported cost savings of $996.

Richland Operations Office

Hanford Site

Water treatment chemicals are either recycled onsite or are returned to the manufacturer. This recycle/reuse activity reduced routine operations hazardous waste by approximately two metric tons, for a reported cost savings of $4,977.

Propylene glycol was redeployed onsite. This recycle/reuse activity reduced routine operations hazardous and sanitary wastes by approximately 114 metric tons, for a reported cost savings of $17,133.

Approximately 12,700 pounds of CFC-12 refrigerant were removed from remaining chillers at the site, and were sold to a vendor for $10/pound. The CFC-12 was replaced with a CFC-free refrigerant, HFC-134a. This

recycle/reuse activity reduced cleanup/stabilization hazardous waste by approximately six metric tons, for a reported cost savings of $127,000.

Ferrous metals are sold to a local recycler. This recycle/reuse activity reduced routine operations sanitary waste by approximately 298 metric tons, for a reported cost savings of $74,459.

Mixed fuels are recycled through an offsite vendor. This recycle/reuse activity reduced routine operations sanitary waste by approximately 107 metric tons, for a reported cost savings of $21,430.

The 300 Area Facility decontaminated numerous items (including process tanks, machinery, floors, and associated equipment and piping) to low-level radioactive waste status, avoiding a low-level mixed wastestream and associated disposal costs. This segregation activity reduced cleanup/stabilization low-level mixed waste by approximately 170 cubic meters, for a reported cost savings of $2,242,000.

Well sampling at the UP-1 wells was reduced from eight times per year to four times per year, reducing the amount of purgewater sent to the Liquid Effluent Reduction Facility by 4,400 gallons/year. This source reduction activity reduced cleanup/stabilization low-level mixed wastewater by approximately 17 cubic meters, for a reported cost savings of $275.

Pacific Northwest National Laboratory

Inductively Coupled Plasma Mass Spectrometry analysis of radioactive material requires a volume of 5-10 milliliters of sample aspirated at a rate of approximately one milliliter/minute. Much of this waste was eliminated with the purchase of a microconcentric nebulizer that aspirates samples at a rate of approximately 0.1 milliliter/minute, while providing the same or better instrument sensitivity as the standard nebulizer. Benefits include reduced analysis waste, reduced unused sample waste, and less worker exposure. This recycle/reuse activity reduced routine operations low-level mixed waste by less than one cubic meter, for a reported cost savings of $600.

During removal of an underground tank system at the PDL-East building, the concrete vaults surrounding the tanks were determined to be chemically uncontaminated and did not need to be removed (excavating and breaking up the concrete vaults would have generated 300 cubic feet of sanitary waste). In addition, the oil separator and underground tank were removed, crushed, and sent to the scrap yard for recycling, which reduced sanitary waste by an additional 1,970 pounds. This segregation activity reduced cleanup/stabilization sanitary waste by approximately nine metric tons, for a reported cost savings of $16,000.

Maintaining the cooling water ponds at the ROB and LSL-II buildings requires that pond water be drained periodically to clean debris from the bottom. Originally, water from both ponds was drained simultaneously, and then each was cleaned. A change in procedures drained the water from only one pond, and after it was cleaned, water from the second pond was transferred to it so the second pond could be cleaned and filled. The new procedure resulted in much less water (i.e., only 500,000 gallons) being sent to the process sewer. This source reduction activity reduced routine operations wastewater by 2,365 cubic meters, for a reported cost savings of $6,250.

Rocky Flats Field Office

Rocky Flats Environmental Technology Site

The Chemical Life-Cycle/Chemical Dispensary Program finds end-users for chemicals not needed onsite, otherwise, the chemicals are sold offsite. Cost savings derive from reduced procurement costs as well as avoided waste disposal costs. This recycle/reuse activity reduced routine operations hazardous waste by less than one metric ton, for a reported cost savings of $545.

Scrap metals (including stainless steel, copper, iron, and aluminum) are recycled from deactivation and decommissioning activities. This recycle/reuse activity reduced cleanup/stabilization sanitary waste by approximately 329 metric tons, for a reported cost savings of $19,250.

Before demolishing the B-123 Facility, the concrete was surveyed; three floor sections and two wall sections were determined to be radioactively contaminated. Rather than disposing of the sections as low-level radioactive waste, contaminated surfaces were removed, and the remainder of the concrete was released as

sanitary waste. This segregation activity reduced cleanup/stabilization low-level radioactive waste by approximately 21 cubic meters, for a reported cost savings of $4,298.

Savannah River Operations Office

Savannah River Site

The Savannah River Technology Center and the Technical Services Division implemented four recycle/reuse projects. Two of the projects involved implementing launderable shoe cover programs, in Building 773-A and in the Central Laboratory. Another project involved implementing an equipment segregation program at the Fabrication Laboratory where excess equipment is surveyed and cleared for free-release and recycling. The last project involved free-releasing a roll-up door located in a roll-back area of the Building 772-F service floor. If contaminated, the door would have been disposed as low-level radioactive waste. The roll-up door was cleared by the facility Radiological Control Officer support personnel, and was sent to site excess for reuse. These four recycle/reuse projects reduced routine operations low-level radioactive waste by a total of approximately 27 cubic meters, for a total reported cost savings of $40,768.

The High-Level Waste Division's In-Tank Precipitation (ITP) Facility implemented a project that allowed the unconditional release of eight containment huts as "Green Is Clean" rather than disposing of them as low-level radioactive waste. Radiological containment huts used in contaminated areas and high contamination areas were normally dismantled and placed in B-25 boxes as low-level radioactive waste. Each used hut generates approximately 36 cubic feet of materials, most of which can be surveyed by Rad Con staff and free-released as "Green Is Clean." The Generator Certifying Official and Plant Support Group worked diligently to ensure that all dismantled huts and framing materials were surveyed for unconditional release. ITP personnel, assisted by Rad Con staff, have successfully cleared eight huts, thus avoiding the generation of low-level radioactive waste. This recycle/reuse activity reduced routine operations low-level radioactive waste by approximately 10 cubic meters, for a reported cost savings of $16,200.

The Metallurgy Laboratory, located in Building 235-F, completed a project to implement second sort techniques (including sampling, survey, decontamination, and release), avoiding unnecessary E-Area Vault and low-level radioactive waste disposal costs. A laboratory wall was also removed to allow maintenance personnel access to existing gloveboxes. The wall was placed into four skid pans (12,288 cubic meters), and was identified and managed for E-Area Vault disposal. The facility decontaminated, sampled, and surveyed the wall for free-release. This segregation activity reduced routine operations low-level radioactive waste by approximately 18 cubic meters, for a reported cost savings of $26,560.

The 221-H Canyon Facility completed a waste segregation project on the USF Laydown Yard (considered a contaminated area), resulting in the free-release of material for excess that normally would have been disposed as low-level radioactive waste. The materials (including scaffolding, ladder racks, kerosene heaters, step ladders, cable racks, and barricade posts) were stored in the USF Laydown Yard, and were scheduled for low-level radioactive waste disposal at the E-Area Vault. With approximately 66,246 cubic meters of low-level radioactive waste projected for disposal, these materials were actually decontaminated, surveyed, and free-released for excess. This segregation activity reduced routine operations low-level radioactive waste by approximately 42 cubic meters, for a reported cost savings of $64,356.

10/14/98-EM-ch348